## Embedded Systems and IoT - a.y. 2022-2023

# Assignment #2 - Smart Bridge - Solution sketch

#### v1.0 - 20231212

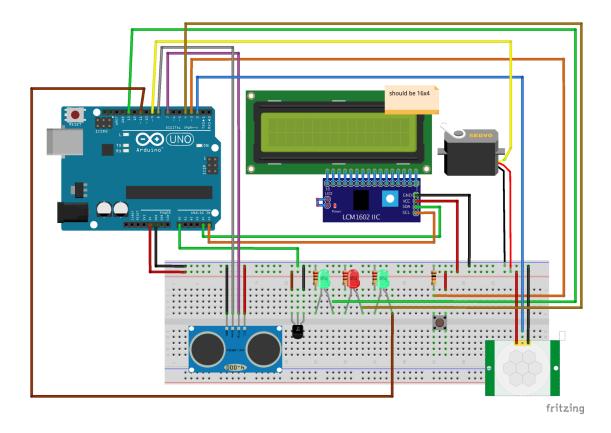
The system is composed by two subsystems

- Arduino subsystem
- PC dashboard subsystem Java application

The two subsystems communicate by means of messages exchanged through the serial line, including log messages that are visualised on the PC application on a specific view.

## Arduino subsystem

### **Breadboard** view



Sources available on the repo: esiot-2023/Assigment-02/src/arduino/smart\_car\_washing

The proposed solution is organised in 7 tasks:

#### WashingWorkflowManTask

o main task, managing the global workflow of a car washing process

#### CheckInTask

o task controlling the check-in stage

#### WashingTask

task controlling the washing stage

#### CheckOutTask

task controlling the check-out stage

#### TelemetryTask

o task sending telemetry data to the dashboard

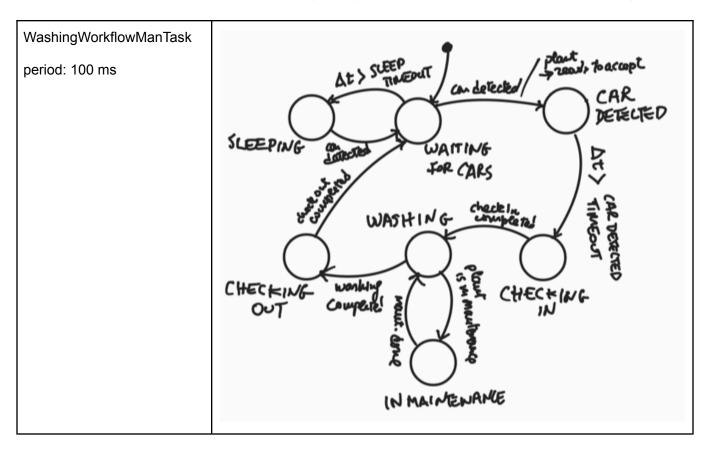
#### • CheckInBlinkTask

- o task blinking a led during the check-in stage
- activated and deactivated by CheckInTask

#### WashingBlinkTask

- o task blinking a led during the washing stage
- activated and deactivated by WashingTask

Task behaviour (and code) is described by the synchronous FSM represented in the following:



CheckInTask period: 200ms	DE CHOSING GATE DESCRIPTIONS CAR CAL IN CLOSING TIMEOUT
WashingTask period: 100 ms	WASHING PROBUM CONTROLL  WASHING PROBUM CONTROLL  WASHING PROBUM CONTROLL  WASHING PROBUM DETECTED  PACE  WASHING PROBUM DETECTED

CheckOutTask	
period: 200 ms	GATE OPENING  CAR  LEAVING  TIME  GATE  CLOSING  TIME  GATE  CLOSING  TIME  CLOSI
TelemetryTask period: 500 ms	Lime to sample  SEMPING DATA
BlinkTask period 100 ms	OFF Ar = Levik or period

Besides tasks, the set of main components of the system includes:

- CarWashingPlant (src/model/CarWashingPlant.h, src/model/CarWashingPlant.cpp)
  - o main entity of the model, representing the plant, shared among tasks

- o highlights
  - it has a state
- **UserConsole** (src/UserConsole.h, src/UserConsole.cpp)
  - o component used to enable interaction with users

### PC dashboard subsystem

Main components of the dashboard subsystem:

- MonitoringAgent
  - o active component receiving messages sent on the serial, to update the view
- SmartCarWashingDashboardView
  - view part of the application with proper text fields to visualise the state of the plan
- SmartCarWashingDashboardController
  - o manage events from the view, sending messages to the Arduino subsystem
- LogView
  - o part of the view where log messages are routed by the MonitoringAgent.
    - Log messages starts with "lo:" prefix, while application-level messages have the "cw:" prefix